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| 10/692,495   | 10/24/2003  | Abhijeet Gole        | 5693P029                  | 1876                   |
| 48102 7590 09/05/2007<br>NETWORK APPLIANCE/BLAKELY<br>1279 OAKMEAD PARKWAY<br>SUNNYVALE, CA 94085-4040 |             |                      | EXAMINER<br>VO, THANH DUC |                        |
|  |             |                      | ART UNIT<br>2189          | PAPER NUMBER           |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/692,495

**Applicant(s)**

GOLE ET AL.

**Examiner**

Thanh D. Vo

**Art Unit**

2189

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,6-8,10,12,14,15,17 and 19-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6-8,10,12,14,15,17 and 19-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This Office Action is responsive to the Amendment filed on June 8, 2007. Claims 1, 4, 10, 15, 17, and 21-22 have been amended. Claims 1, 3-4, 6-8, 10, 12, 14-15, 17, and 19-23 are presented for examination. Claims 1, 3-4, 6-8, 10, 12, 14-15, 17, and 19-23 are pending. All objections or rejections not repeated below are withdrawn.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 3, 4, and 6-8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As per claim 1, the following citation contains subject matter which was not described in the specification:

"when the first portion of the non-volatile storage device in the first storage server is full, **applying** the data access request in the first portion of the non-volatile storage device to a volume managed by the first storage server, and causing the second storage server to **apply** the data access request in the file stored in the mass storage device to an image volume of the volume, wherein the second storage server manages the image volume and the mass storage device."

The paragraph [0044] of the current invention particular discloses that "when the partition 204 is full, a consistency point (CP) is issued on the source filer 102, and the requests are applied to the volume 110 managed by the source filer 102 and the image volume 112 managed by the destination file 104". Therefore, the limitation as being claimed in claim 1 does not particularly correspond with the method as being disclosed on the specification on paragraph [0044].

All dependent claims are rejected as having the same deficiencies as the claims they depend from.

Appropriate correction is required.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 3, 4, 6-8, 17, 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claim 1, the following citation is indefinite:

"when the first portion of the non-volatile storage device in the first storage server is full, **applying** the data access request in the first portion of the non-volatile storage device to a volume managed by the first storage server, and causing the second storage server to **apply** the data access request in the file stored in the mass storage device to an image volume of the volume, wherein the second storage server manages the image volume and the mass storage device."

The limitation above is indefinite because the condition and the correlation amongst the limitations are not clearly presented and/or particularly pointed out the subject matter which applicant regards as the invention. The limitation above is not written in such a way to provide a concrete structure and a proper causal relationship amongst the limitations in order to particularly point out the subject matter which application regards are the invention in paragraphs [0042-0044].

As per claim 17, the phrase "**applying** the data access request in the first file to an image of a volume" on page 6, line 6 of claim 17 is incomprehensible and it does not give a meaning or structure to the claim. The Examiner is unable to make clear of the subject matter that the Applicant is trying to claim.

It is noted that the term "apply" or "applying" uses in the context of claims 1 and 17 potentially be the reason that causes the confusion or indefinite to claims 1 and 17. A better word choice is recommended to further distinguish the subject matter as being claimed.

All dependent claims are rejected as having the same deficiencies as the claims they depend from.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 21 and 23 are rejected under 35 U.S.C. 102(b) as being unpatentable over Yanai et al. (6,502,205).

As per claim 21, Yanai et al. disclose a method of mirroring data, the method comprising, the method comprising:

operating a destination storage server to maintain a plurality of mirror volumes (Fig. 4, disk drive in secondary storage server) in a non-volatile mass storage subsystem (Fig. 1, disk array), wherein each mirror volume mirrors a corresponding one of a plurality of source volumes maintained by a plurality of source storage servers that are coupled to communicate with the destination storage server (col. 2, lines 60-65);

receiving, at the destination storage server, write requests from the plurality of source storage servers, each said write request corresponding to a write request received by one of the plurality of source storage servers from a storage client for updating one of the plurality of source volumes (col. 2, lines 60-67);

operating the destination storage server to store the write requests temporarily prior to synchronizing the mirror volumes with the source volumes, including storing a log of the write requests received by the destination storage server from the plurality

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source storage servers in a non-volatile random access memory (col. 18, lines 5-9) in the destination storage server (col. 32, lines 49-58),

using the destination storage server to maintain a plurality of files in a non-volatile mass storage subsystem, each said file corresponding to a separate one of the plurality of source storage servers, and storing each write request received by the destination storage server from a source storage server in one of said files which corresponds to said source storage server (col. 32, lines 59-67); and

in response to receiving a specified signal from the source storage server, operating the destination storage server to synchronize the plurality of mirror volumes with the plurality of source volumes based on the write requests received from the plurality of source storage servers (col. 32, lines 49-58, wherein a specified signal from the source storage server is inherent in Yanai et al. in order to perform the operation in the cited lines and column).

As per claim 23, Yanai et al. discloses a method, wherein each partition of the partitioned non-volatile random access memory in each of the source storage servers corresponds to a distinct one of the plurality of files in the non-volatile mass storage subsystem. See Fig. 12, items 293 and 294, wherein the log file is corresponding to the data file.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3, 4, 6, 10, 12, 14-15, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanai et al. (US Patent 6,502,205) in view of Courts et al. (US Patent 5,636,360)

As per claims 1 and 10, Yanai et al. discloses a method for mirroring data comprising:

receiving at a first storage server (Fig. 1, item 14) a data access request from a client (Fig. 1, item 12) coupled to the first storage server 14 (See col. 2, line 60 - col. 3, line 9);

writing the data access request to a first portion of a non-volatile storage device (Fig. 1, item 28) in the first storage server (col. 7, line 66 – col. 8, line 1);

transmitting the data access request from the first storage server 14 to a second storage server (Fig. 1, item 46), wherein the second storage server writes the data to the data access request into a file stored in a mass storage device (Fig. 1, item 48) on the second storage server (See col. 10, lines 51-55);

applying the data access request in the first portion of the non-volatile storage device to a volume managed by the first storage server and causing the second storage server to apply the data access request in the file stored in the mass storage device to



an image volume of the volume, wherein the second storage server manages the image volume and the mass storage device. See Fig. 12, col. 32, lines 49-67, wherein the secondary volume is an image of primary volume and the primary volume is managed by the primary storage system and the secondary volume is managed by the secondary storage system. In addition, non-volatile storage device and mass storage device are equivalent to the disk drives in the primary and secondary storage system to make up the volumes.

Yanai et al. does not particular teach when a log file is full then the data is transferred to the log file of the secondary storage device.

Court et al. teaches a method of copying the contents of a log buffer to a log partition when the log buffer is full (col. 2, lines 35-37).

Therefore, it would have been obvious to one having an ordinary skill in the art at the time of the Applicant invention modify the cache of Yanai et al. to implement the method teaches by Court et al. to arrive at the current invention. The motivation of doing so is to avoid the data currently storing in the cache to be overwritten by the incoming data when the data currently storing in the cache are critical or valuable data as being taught by Yanai et al. at col. 1, lines 47-56.

As per claim 3, Yanai et al. sending a synchronization request at the second storage server from the first storage server when the first portion of the non-volatile storage device in the first server is full (see col. 10, lines 19-23); wherein as discussed

in claim 1 above, the data is transferred from cache to R1 and R1 synchronize the updated data with R2.

As per claim 4, Yanai et al. discloses a method comprising:

sending an acknowledgement from the second storage server to the first storage server in response to receiving the data access request (col. 10, lines 19-24) to cause the first storage server to send a response to the client (col. 32, lines 26-27) after the data access request has been stored on the first storage server and stored in the mass storage device on the second storage server. See col. 32, lines 49-57 and col. 2, lines 60-67.

As per claim 6, file is associated with the first portion of the non-volatile storage device in the first storage server is inherent feature of Yanai et al. since the data that stored in the second storage server is previously transferred from the cache, therefore they are associated or related with each other.

As per claim 7, Yanai et al. discloses a method wherein the data access request is transmitted from the first storage server to the second storage server over a network. (Fig. 12, items 240-241 and col. 12, lines 40-42)

As per claim 8, Yanai et al. discloses a method comprising:

assigning a sequence number to the data access request, wherein the sequence number designates a position of the data access request in a group of data access requests to ensure that the data access request is properly ordered within the data container. See col. 18 lines 45-54.

As per claim 12, Yanai et al. discloses an apparatus wherein the network comprises a Transmission Control Protocol/Internet Protocol (TCP/IP) network. See col. 13, lines 7-13, wherein the TCP/IP is an inherent feature of the ESCON system.

As per claim 14, Yanai et al. discloses an apparatus wherein the memory comprises a nonvolatile random access memory (NVRAM). See col. 18, lines 5-9, *wherein random access memory is backed-up by a battery power which makes the RAM becomes a nonvolatile random access memory.*

As per claim 15, Yanai et al. discloses an apparatus wherein the destination storage server modifies an image of a volume maintained by the source storage server on a second nonvolatile mass storage device (secondary volumes) coupled to the destination storage server according to the access request (col. 10, lines 50-58) when the source storage server makes a synchronization request (col. 10, lines 19-23).

As per claim 22, Yanai et al. discloses method, wherein each of the source storage servers maintains a separate log of write requests from storage clients in a partitioned non-volatile random access memory (Fig. 12, item 291).

Yanai et al. does not particular disclose that the specified signal is corresponding to a partition become full in one of the non-volatile random access memory.

Court et al. discloses method of copying the contents of a log buffer to a log partition when the log buffer is full (col. 2, lines 35-37).

It would have been obvious to one having an ordinary skill in the art at the time of the invention to readily recognize that the specified signal can be a signal indicating that a particular storage area is full as disclosed by Court et al. Therefore, it would have been obvious to one having at the time of the invention to modify the signal of Yanai et al. to be a signal indicating that a non-volatile random access memory is full in order to arrive at the current invention. The motivation of doing so is to enable the source storage server to know that there is data need to be written from the memory to the storage device before the data could be lost or causing the system to be delayed.

6. Claims 17, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanai et al. (6,502,205) in view of McMillian, Jr., Achiwa et a. (US 20040153719) and Courts et al. (US Patent 5,636,360).

As per claim 17, Yanai et al. discloses a method comprising:

receiving a data access request at a destination filer from a first source filer (col. 9, lines 59-64, wherein the data is copied to the second storage system from the primary storage system and the data is externally influenced by a host coupled to the primary storage system), wherein the data access request is written to a first portion (Fig. 18, item 502) of a first memory (Fig. 1, item 228) coupled to the source filer (col. 7, line 66 – col. 8, line 1);

sending an acknowledgement to the first source filer in response to the destination filer receiving the data access request (col. 10, lines 19-24);

writing the data access request to a second memory (Fig. 1, item 64) in the destination filer (col. 20, lines 10-13);

transferring the data access request from the second memory to a file corresponding to a source filer on a volume managed by the destination filer (col. 20, lines 5-13);

receiving a second data access request from a second source filer (col. 2, lines 54-59), wherein the second data access request is written to a third memory coupled to the second source filer (col. 32, lines 55-56);

sending a second acknowledgement to the second source filer in response to the destination filer receiving the second data access request (col. 10, lines 19-24);

writing the second data access request to the second memory (Fig. 12, item 293, col. 32, lines 49-57);

transferring the second data access request from the second memory to a second file corresponding to the second source filer on the volume coupled to the destination filer (col. 32, lines 37-38; lines 49-53);

when the first portion of the non-volatile storage device in the first storage server is full, applying the data access request to a volume managed by the first storage server and causing the second storage server to apply the data access request to an image volume of the volume. See col. 20, lines 5-20, wherein the data is transferred from the cache to the R1 volume of the first storage server then the data is also transferred to the R2 of the second storage server.

Yanai et al. does not particular teach when a cache is full then the data is transferred to the secondary storage devices.

Court et al. teaches a method of copying the contents of a log buffer to a log partition when the log buffer is full (col. 2, lines 35-37).

Therefore, it would have been obvious to one having an ordinary skill in the art at the time of the Applicant invention modify the cache of Yanai et al. to implement the method teaches by Court et al. to arrive at the current invention. The motivation of doing so is to avoid the data currently storing in the cache to be overwritten by the incoming data when the data currently storing in the cache are critical or valuable data as being taught by Yanai et al. at col. 1, lines 47-56.

Yanai et al. did not explicitly disclose a method of removing the data access request from the second memory after transferring the data access request to the volume. However, McMillan disclosed a method of removing a request when an acknowledgement is transferred from one location to another (col. 5, lines 35-39). At the time of the Applicant's invention it would have been obvious to one having an ordinary skill in the art to recognize that it is advantageous to remove/delete the access request once the transaction is completed or the data has been transferred. The motivation of doing so is to prevent unnecessary data from transferring to the volume again and maintaining an appropriate operation of the system while increasing data throughput.

Yanai et al. does not disclose a second source filer coupled to the destination filer which performing the duplicate tasks as of the first source filer. However, Achiwa et

al. discloses a system wherein there are multiple storage servers interconnected with each other in order to replicate the copy of data stored in the storage device. See Fig. 1 and page 1, paragraph 0009, lines 1-12.

As per claim 19, Yanai et al. did not explicitly disclose a method of connecting a second source filer to the client in response to a system failure.

However, Achiwa et al. discloses a method further comprising connecting the second source filer to the client in response to a system failure. See page 1, paragraph 0006, lines 4-7.

It would have been obvious to one having an ordinary skill in the art at the time of the Applicant's invention to connect the source filer to the client in response to the system failure. The motivation of doing so is to provide a stable storage system since there are additional sources to take over the operation process if one of the other sources failed.

As per claim 20, Yanai et al. discloses allowing the client to access the image. See col. 17, lines 25-40.

***Response to Arguments***

7. Applicant's arguments filed on December 22, 2006 have been fully considered but they are not persuasive.

With respect to the USC 102 Rejections of claim 21, the remarks filed on June 8, 2006, Applicant indicates on page 12 that Yanai et al. fails to disclose:

"using the destination storage server to maintain a plurality of files in a non-volatile mass storage subsystem, each said file corresponding to a separate one of the plurality of source storage servers".

Examiner respectfully disagrees with the Applicant's remarks. Although Yanai discloses log file and data file in singular term but such log file and data file illustrate in Fig. 12 inherently comprising multiple data files because the storage system of Yanai are storage servers, wherein storage servers are used to storage a mass amount of data which collectively comprising mass amount of data files. In addition, because the secondary storage system is mirroring with the primary storage system, therefore each file in the destination storage system is corresponding to each file of the primary storage system.

With respect to USC 103 Rejections of claim 1, Applicant appears to read the disclosure of the Specification into the claim limitations that Applicant indicates Yanai et al. and Courts et al. fail to teach. It is noted that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).



As reasoned in the USC 103 Rejection above, Yanai et al. does not disclose a method of transferring the data from a first storage to a second storage if the first storage is full. Courts et al. fulfill the deficiency of Yanai et al. by disclosing such method. Therefore, at the time of the Applicant's invention, it would have been obvious to one having an ordinary skill in the art to utilize the method of transferring data from the buffer to a log if the buffer becomes full. Applicant is kindly reminded that although Courts et al. does not teach every single limitation as being claimed in the current invention but Courts et al. clearly teaches the method of transferring data once it is full; wherein such method is useful and obvious to implement into Yanai et al. invention in order to arrive at the current invention.

With respect to the Applicant's argument to claim 17 on page 15:

Applicant argues that Yanai, McMillan, and Achiwa fail to teach the limitation indicated on page 15. Applicant is respectfully reminded that claim 17 is rejected as being unpatentable over Yanai et al. (6,502,205) in view of McMillan, Jr., Achiwa et al. (US 20040153719) and **Courts** et al. (US Patent 5,636,360).

Because the limitation in claim 17 is equivalent to the limitation of claim 1 above, therefore claim 17 is rejected under the same rationale as of claim 1.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

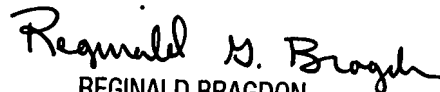
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh D. Vo whose telephone number is (571) 272-0708. The examiner can normally be reached on M-F 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reginald G. Bragdon can be reached on (571) 272-4204. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Thanh D. Vo  
Patent Examiner  
AU 2189  
8/22/2007



REGINALD BRAGDON  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100